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SPECIFICATION FOR BARIUM CARBONATE, PESTICIDAL GRADE

UDC 632·951 : 661·844·622

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 3

April 1985

Indian Standard

SPECIFICATION FOR BARIUM CARBONATE, PESTICIDAL GRADE

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(*Continued on page* 2)

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(*Continued on page* 9)

Indian Standard

SPECIFICATION FOR BARIUM CARBONATE, PESTICIDAL GRADE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 31 December 1984, after the draft finalized by the Pest Control Sectional Committee had been approved by the Agricultural and Food Products Division Council and the Chemical Division Council.

0.2 Barium carbonate has long been used as a rat poison. Rat baits are usually prepared of one part barium carbonate and four parts of a protein-carbohydrate rich food, such as rolled oats, fish meal, moistened with milk or water.

0.3 The empirical formula and molecular mass of the barium carbonate are as given below:

Empirical Formula	*Molecular Mass*
$BaCO_3$	197

0.4 In the preparation of this standard due consideration has been given to the provisions of the *Insecticides Act*, 1968 and the rules framed thereunder. However, this standard is subject to the restrictions imposed underthese, wherever applicable.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the method of sampling and test for barium carbonate, pesticidal grade.

---

*Rules for rounding off numerical values (*revised*).

2. REQUIREMENTS

2.1 Description — The material shall be in the form of dense white powder, odourless, non-volatile and free from extraneous matter.

2.2 The material shall also comply with the requirements specified in Table 1.

TABLE 1 REQUIREMENTS FOR BARIUM CARBONALE, PESTICIDAL GRADE

SL NO.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO	
			Appendix of this Standard	Cl No. of IS : 6940-1982*
(1)	(2)	(3)	(4)	(5)
i)	Barium carbonate content, percent by mass, Min	97	A	
ii)	Moisture content, percent by mass, *Max*	0.25	—	4
iii)	Matter insoluble in hydrochloric acid, percent by mass, *Max*	1'5	B	—
iv)	Alkalinity (as NaOH), percent by mass, *Max*	0·1	—	11'3

*Methods of test for pesticides and their formulations (*first revision*).

3. PACKING AND MARKING

3.1 Packing — The material shall be packed in clean and dry containers made of mild steel or tinplate or fibreboard with a loose liner of HDPE of thickness not less than 0·062 mm. The containers shall also comply with general requirements as given in 2 of IS : 8190 (Part 1)-1980*.

3.2 **Marking** — The containers shall bear legibly and indelibly the following information and any other information as is necessary under the *Insecticides Act* and Rules:

a) Name of the material;

b) Name of the manufacturer;

c) Date of manufacture;

---

*Requirements for packing of pesticides: Part 1 Solid pesticides (*first* revision).

d) Batch number;

e) Net mass of the contents;

f) Barium carbonate content, percent (*m/m*); and

g) A cautionary notice as worded in *Insecticides Act* and Rules.

3.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in IS : 10946-1984*.

5. TESTS

5.1 Tests shall be carried out by the methods referred to in col 4 and 5 of Table 1.

5.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (see IS : 1070-1977†) shall be employed in tests.

NOTE — ' Pure Chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

APPENDIX A

[*Table* 1, *Item* (i)]

DETERMINATION OF BARIUM CARBONATE CONTENT

A-0. PRINCIPLE

A-0.1 Barium is precipitated as barium chromate which is then dissolved in dilute hydrochloric acid and treated with solid potassium iodide. The liberated iodine is titrated against standard sodium thiosulphate solution.

---

*Method of sampling for technical grade pesticides.

†Specification for water for general laboratory use (*second revision*).

A-1. REAGENTS

A-1.1 Hydrochloric Acid — 1 : 1 (*v/v*).

A-1.2 Hydrochloric Acid — concentrated.

A-1.3 Ammonium Hydroxide — 20 percent.

A-1.4 Ammonium Chloride — solid.

A-1.5 Hydrogen Sulphide — gas.

A-1.6 Lead Acetate Paper

A-1.7 Methyl Orange Indicator — Dissolve 0·1 g of methyl orange in 100 ml of water.

A-1.8 Acetic Acid — glacial.

A-1.9 Ammonium Acetate Solution — 30 percent (*m/v*).

A-1.10 Ammonium Chromate Solution — 10 percent (*m/v*), neutral to methyl orange.

A-1.11 Ammonium Chromate Solution- one percent (*m/v*), neutral to methyl orange.

A-1.12 Ammonium Carbonate Solution — approximately 20 percent (*m/v*).

A-1.13 Silver Nitrate Solution — approximately 2 percent (*m/v*).

A-1.14 Nitric Acid — approximately 2 N.

A-1.15 Potassium Iodide — solid.

A-1.16 Standard Sodium Thiosulphate Solution — 0·1 N.

A-1.17 Starch Indicator Solution

A-2. PROCEDURE

A-2.1 Weigh accurately about 0·25 g of the material and dissolve in about 30 ml of dilute hydrochloric acid. Evaporate the solution to dryness and render silica insoluble by baking at 110°C with intermittent additions of small quantities of concentrated hydrochloric acid. Dissolve the residue in 20 ml of concentrated hydrochloric acid, add 100 ml of water, boil and filter. Wash the residue with water. Collect the filtrate and the washings in a 500-ml beaker and make it alkaline with concentrated ammonium hydroxide. Add about 1 g of ammonium chloride, pass hydrogen sulphide gas and filter. Pass hydrogen rulphide gas through the filtrate again till no turbidity appears. Boil the filtrate to drive away hydrogen sulphide and test for complete removal of the gas by lead acetate paper. Neutralize the solution with dilute hydrochloric acid using methyl orange as indicator. Add 5 to 6 drops of glacial acetic acid together with ammonium acetate solution to neutralize any free mineral acid. Heat the solution and add an excess of ammonium chromate solution.

A-2.2 Allow the precipitate of barium chromate to settle for an hour. Filter through a filter paper and wash with one percent ammonium chromate solution until the filtrate is free of soluble strontium and calcium salts which are tested if a portion of the filtrate produces no cloudiness with ammonium hydroxide and ammonium carbonate. Finally, wash the residue free of ammonium chromate with water till a portion of the filtrate gives only slight reddish brown colour with silver nitrate solution.

A-2.3 Pierce the filter paper containing the barium chromate precipitate and wash the precipitate into a beaker with hot dilute nitric acid. Dilute the solution to about 200 ml and boil. Add ammonium acetate solution to neutralize any free nitric acid. Heat and add sufficient ammonium chromate solution. Filter and repeat washings as in A-2.2 above. Dissolve the precipitate of barium chromate finally in 50 to 100 ml of dilute hydrochloric acid, add about 2 g of solid potassium iodide and allow to react for 10 minutes. Titrate the liberated iodine with standard sodium thiosulphate solution, using starch as indicator.

A-3 CALCULATION

$$\text{Barium carbonate content, percent by mass} = \frac{0.457\,9 \times V}{M}$$

where

V = volume in ml of standard sodium thiosulphate, and
M = mass in g of the material taken for the test.

APPENDIX B

[*Table* 1, *Item* (iii)]

DETERMINATION OF MATTER INSOLUBLE IN HYDROCHLORIC ACID

B-1. REAGENT

B-1.1 Hydrochloric Acid — Concentrated

B-2.1 PROCEDURE

B-2.1 Mix 10 g the material with 100 ml of water and add slowly 10 ml of concentrated hydrochloric acid. Dilute with water to 200 ml and heat on a steam-bath for 30 minutes. Filter the hot solution through a previously dried and weighed sintered glass crucible. Wash the residue with water slightly acidified with hydrochloric acid. Again wash the crucible with hot water till the filtrate is free from acid. Place the crucible in a oven maintained at 110 ± 2°C for 2 hours. Cool the crucible in a dessicator and weigh.

B-3. CALCULATION

Matter insoluble in hydrochloric acid, percent by mass $= 100 \times \frac{(M_2 - M_1)}{M}$

where

M_2 = mass in g of the crucible after filtration,
M_1 = mass in g ofthe crucible before filtration, and
M = mass in g of the material taken for the test.

(Continued from page 2)

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INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	**radian**	rad
Solid angle	**steradian**	**sr**

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
orcc	newton	N	1 N = 1 **kg.m/s^2**
Energy	joule	J	**1** J = 1 N.m
Power	watt	**W**	**1 W = 1 J/s**
Flux	weber	Wb	1 **Wb = 1 V.s**
Flux density	tesla	T	1 **T = 1 Wb/m^2**
Frequency	hertz	HZ	**1 Hz = 1 c/s** (s^{-1})
Electric conductance	**siemens**	S	**1 S = 1 A/V**
Electromotive force	volt	V	1 **v = 1 W/A**
Pressure, stress	**pascal**	Pa	1 **Pa = 1 N/m^2**